

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Original) A belt transmission apparatus comprising:

a rotating electric machine pulley of a rotating electric machine for transmitting starting power to an engine;

an engine pulley for transmitting the starting power to said engine and also transmitting a rotation power of said engine to an accessory;

an auxiliary pulley being driven to rotate by the power from said engine pulley thereby to drive said accessory;

a belt wrapped around said rotating electric machine pulley, said engine pulley and said auxiliary pulley in succession; and

a belt tension adjuster for urging said belt so as to set a tension of said belt in a plurality of stages,

wherein said tension adjuster acts to adjust the tension of the belt in such a manner that the belt tension is set to be greater when said engine is started by said rotating electric machine than when said accessory is driven to operate after said engine has been started.

2. (Original) The belt transmission apparatus according to claim 1, wherein said tension adjuster is disposed in an area in which a slack of said belt occurring when said engine is started by said rotating electric machine becomes the greatest.

3. (Original) The belt transmission apparatus according to claim 1, wherein said tension adjuster comprises:

a pulley unit around which said belt is wrapped whereby to rotate in accordance with movement of said belt; and

an automatic belt tensioner for urging said pulley unit to push said belt through said pulley unit.

4. (Original) The belt transmission apparatus according to claim 3, wherein said automatic belt tensioner comprises:

an elastically deformable spring; a push rod for urging said pulley unit with a reactive force generated upon elastic deformation of said spring; and

an elastic deformation unit for elastically deforming said spring.

5. (Original) The belt transmission apparatus according to claim 4, wherein said elastic deformation unit comprises:

an electromagnetic coil; and

a movable electromagnetic core adapted to be attracted by an electromagnetic attraction force developed upon energization of said electromagnetic coil thereby to push said spring.

6. (Original) The belt transmission apparatus according to claim 4, wherein said elastic deformation unit comprises:

an electromagnetic coil;

a spool adapted to be moved by an electromagnetic attraction force developed upon energization of said electromagnetic coil;

a cylindrical housing having a fluid chamber into which pressure fluid is caused to flow in accordance with movement of said spool; and

a piston adapted to be moved to push said spring in accordance with an increasing pressure in said fluid chamber.

7. (Original) The belt transmission apparatus according to claim 4, wherein said elastic deformation unit comprises:

a wax housing having a diaphragm chamber defined therein by a diaphragm and filled with a wax;

a heater unit mounted on said wax housing and adapted to generate heat when energized; and

a piston adapted to push said spring in accordance with an expansion of said wax heated by the heat generated by said heater unit.

8. (Original) The belt transmission apparatus according to claim 4, wherein said elastic deformation unit comprises:

an electric motor;

a screw type position adjustment shaft adapted to be rotated by torque of said electric motor transmitted thereto; and

a screw type movable disk adapted to be moved in an axial direction to push said spring in accordance with rotation of said screw type position adjustment shaft.

9. (Currently Amended) The belt transmission apparatus according to claim 4, said automatic belt tensioner further comprising a housing having said spring accommodated therein with a viscous fluid filled therein.

10. (Original) The belt transmission apparatus according to claim 1, wherein said engine comprises a vehicular engine.

11. (Original) The belt transmission apparatus according to claim 10, wherein the position of said push rod is set by a signal from a central processing unit which processes information comprising, at least, an rpm of said engine, an engine starting signal, a vehicle speed, and the tension of said belt.

12. (Original) The belt transmission apparatus according to claim 1, wherein said rotating electric machine comprises a starter motor.

13. (Original) The belt transmission apparatus according to claim 1, wherein said rotating electric machine comprises a motor generator.

14. (New) A belt transmission apparatus mounted on an engine, comprising:
an electric machine pulley rotatably connected to a rotating electric machine;
an engine pulley rotatably connected to a crankshaft of said engine;
an auxiliary pulley rotatably mounted to an accessory;
a tension pulley rotatably connected to a pulley unit,
an automatic belt tensioner connected to said pulley unit;
a belt wrapped around said electric machine pulley, said engine pulley, said auxiliary pulley and said tension pulley; wherein
said belt transmits starting power from said rotating electric machine to said engine, and
transmits rotation power of said engine to said accessory;
said pulley unit is movably connected to said engine;
said automatic belt tensioner urges the movement of said pulley unit based upon an operational condition of the engine, thereby setting a tension in said belt that is greater when said engine is started by said rotating electric machine than when said engine is running and said belt is transmitting rotation power to said accessory.

15. (New) The belt transmission apparatus according to claim 14, wherein said pulley unit is movable rotatably around an axis offset from said rotatable connection between said

tension pulley and said pulley unit, and said tension pulley and said pulley unit rotate in planes generally parallel to each other.

16. (New) The belt transmission apparatus according to claim 14, wherein said automatic belt tensioner comprises:

a first cylindrical housing with axial end walls;

a piston axially movable within said cylindrical housing;

a push rod axially movable within said cylindrical housing and extending through one of said axial end walls to contact said pulley unit;

an first elastically deformable spring arranged between said piston and said push rod; and

a control unit that axially moves said piston.

17. (New) The belt transmission apparatus according to claim 16, wherein said control unit comprises:

a second cylindrical housing;

an electromagnetic coil;

a spool axially movable within said cylindrical housing and shaped to form fluid chambers in conjunction with said cylindrical housing;

a second elastically deformable spring arranged between said electromagnetic coil and said spool; wherein

said spool is axially movable to a first position by an electromagnetic attraction force developed upon energization of said electromagnetic coil;

when said spool is moved to said first position, a flow of pressurized fluid is allowed to pass through said control unit and into a pressure oil chamber of said automatic belt tensioner defined by said first cylindrical housing and said piston to thereby axially move said piston and said push rod toward said pulley unit, and raise the tension in said belt.

18. (New) The belt transmission apparatus according to claim 17, wherein said spool is axially movable to a second position by said second elastically deformable spring upon de-energization of said electromagnetic coil;

said second position allowing the flow of fluid from said pressure oil chamber to a holding tank to thereby allow the axial movement of said piston and said push rod away from said pulley unit, and lower the tension in said belt.

19. (New) The belt transmission apparatus according to claim 1, further comprising a tension pulley rotatably connected to a pulley unit, wherein said pulley unit is movably connected to said engine between said tension adjuster and said belt, and said tension adjuster urges the movement of said pulley unit to adjust the tension of said belt.

20. (New) The belt transmission apparatus according to claim 19, wherein said pulley unit is movable rotatably around an axis offset from said rotatable connection between said tension pulley and said pulley unit, and said tension pulley and said pulley unit rotate in planes generally parallel to each other.